CLAIMS

What is claimed is:

1. A method for routing data packets in a packet-switched network, comprising:

receiving a data packet at a network routing device residing in the network, the data packet being formulated in accordance with the Internet Protocol (IP) and having at least one private IP address embedded in an options field of the packet header;

extracting the at least one private IP address from the options field; and

formatting a destination IP address field of the packet header with the at least one private IP address prior to forwarding the data packet.

2. The method of Claim 1 wherein the step of receiving a data packet further comprises receiving the data packet at a public-side interface of the network routing device.

3. The method of Claim 1 further comprises forwarding the data packet through a private-side interface of the network routing device.

4. The method of Claim 1 further comprises defining the options field of the packet header to include an embedded address indicator which indicates the presence of the at least one private IP address in the options field.

5. The method of Claim 1 further comprises formatting the destination IP address field when an IP address residing in the destination IP address of the packet header matches a public-side interface IP address for the network routing device.

6. The method of Claim 1 further comprises reformatting the options field to remove the at least private IP address.

7. The method of Claim 1 wherein the data packet includes two or more private IP addresses appended to each other in a predefined order within the options field of the packet header.

8. The method of Claim 1 further comprises repeating the process at each network routing device interposed between a public network and a destination network device.

9. A network routing device positioned between a private network and a public network in a packet-switched network system, the network routing device adapted to receive data packets at a public-side interface, the data packets being formulated in accordance with Internet Protocol (IP) and having at least one private IP address embedded in a destination address options field of the packet header, the network routing device being operable to extract the at least one private IP address from the destination address options field and format a destination IP address field of the packet header with the at least one private IP address.

10. The network routing device of Claim 9 being further operable to format the destination IP address field when an IP address residing in the destination IP address of the packet header matches a public-side interface IP address for the network routing device.

11. The network routing device of Claim 9 being further operable to reformat the destination address options field after extracting the at least one private IP address from the options field.

12. The network routing device of Claim 9 wherein the data packet includes two or more private IP addresses appended to each other in a predefined order within the options field of the packet header.

13. A method for routing data packets in a packet-switched network, comprising:

receiving a data packet transmitted by an originating network device at a network routing device residing in the network, the data packet being formulated in accordance with the Internet Protocol (IP) and having an original source private IP address in a source IP address field of the packet header and a destination IP address in a destination IP address field of the packet header;

formatting an options field of the packet header with the original source private IP address; and

formatting the source IP address field of the packet header with an IP address for the network routing device prior to forwarding the data packet.

14. The method of Claim 13 wherein the step of receiving a data packet further comprises receiving the data packet at a private-side interface of the network routing device.

15. The method of Claim 13 further comprises forwarding the data packet through a public-side interface of the network routing device

16. The method of Claim 13 further comprises receiving the data packet at a network device having an IP address that matches the destination IP address embedded in the destination IP address field; and extracting the original source private IP address from the options field and the IP address for the network routing device from the source IP address field of the packet header for subsequent communications with the originating network device.

17. The method of Claim 13 further comprises:

receiving the data packet at a another network routing device having a private-side interface IP address;

appending the IP address for the network routing device to the original source private IP address in the options field of the packet header; and

formatting the source IP address field of the packet header with a public interface IP address for the another network routing device prior to forwarding the data packet.

18. The method of Claim 17 further comprises receiving the data packet at a destination network device having an IP address that matches the destination IP address embedded in the destination IP address field; and extracting the original source private IP address and the IP address for the network routing device from the options field and the IP address for the another network routing device from the source IP address field of the packet header for subsequent communications with the originating network device.

19. A network routing device positioned between a private network and a public network in a packet-switched network system, the network routing device adapted to receive data packets at a private-side interface, the data packets being formulated in accordance with Internet Protocol (IP) and having an original source private IP address in a source destination IP address field of the packet header, the network routing device being operable to format an options field of the packet header with the original source private IP address and format the source IP address field of the packet header with a public interface IP address for the network routing device prior to forwarding the data packet.

20. A packet header of a data packet formulated in accordance with the Internet Protocol, the data packet embodied in a carrier wave, comprising an IP address for an originating network device embedded in an options field of the packet header.

21. The packet header of Claim 20 further comprises an embedded address indicator residing in the options field of the packet header, the embedded address indicator indicative of the presence of the IP address in the options field.

22. A packet header of a data packet formulated in accordance with the Internet Protocol, the data packet embodied in a carrier wave, comprising an IP address for a destination network device embedded in an options field of the packet header.

23. The packet header of Claim 22 further comprises an embedded address indicator residing in the options field of the packet header, the embedded address indicator indicative of the presence of the IP address in the options field.

24. A traversable addressing scheme that uniquely identifies a network device residing in a private network and having at least one network routing device interposed between the network device and a public network, comprising concatenating an IP address for the network device in a predefined order with a public side interface IP address for the at least one network routing device to form a traversable network address.

25. The traversable addressing scheme of Claim 24 further comprises formatting an options field of a IP packet header with the traversable network address.

26. The traversable addressing scheme of Claim 24 wherein the public side interface IP address for the at least one network routing device is appended to the IP address for a source network device.

27. The traversable addressing scheme of Claim 24 wherein the public side interface IP address for the at least one network routing device is prepended to the IP address for a destination network device.

28. The traversable addressing scheme of Claim 24 further comprises registering the traversable network address of the network device with a domain name server.

29. The traversable addressing scheme of Claim 24 further comprises determining the traversable network address of the network device by accessing the domain name server.

30. The method of Claim 13 further comprises repeating the process at each network routing device interposed between the originating network device and a public network.